## Outcomes of Limbal Stem Cell Transplant: A Meta-analysis.

**Public Summary:**

In this study, different approaches of limbal stem cell transplantation (LSCT) to restore the ocular surface are compared. Direct transplantation (without the need of expanding the cells ex vivo in the laboratory) is compared to the ex vivo cultivation of cells. Moreover, autologous (from the same patient) procedures are compared to allogeneic (from donor tissue). The findings of this study suggest that LSCT can improve or stabilize the corneal surface and autologous LSCT have a higher success rate and lower complications.

**Scientific Abstract:**

Importance: Limbal stem cell transplant (LSCT) can be categorized as direct autologous limbal transplant (AULT), direct allogenic limbal transplant (ALLT), cultivated autologous limbal stem cells transplant (cAULT), and cultivated allogenic limbal stem cells transplant (cALLT). To our knowledge, there is no study directly comparing the outcomes and complications of these procedures. Objective: To evaluate the outcomes of different LSCT procedures. Data Source: We searched PubMed, EMBASE, Web of Science, and Cochrane without language filter for peer-reviewed articles about LSCT. The latest search was performed on June 30, 2019. Study Selection: Clinical studies with the outcome of at least 20 eyes after LSCT were included. Animal studies and studies of other surgical interventions were excluded. Data Extraction and Synthesis: Two reviewers independently abstracted the data from each study. Heterogeneity was evaluated with the I2 statistic, and a meta-analysis was performed using the random-effects model. Main Outcomes and Measures: Outcome measures included the improvement of ocular surface, visual acuity (VA), and adverse events of recipient eyes and donor eyes. Results: Forty studies (2202 eyes) with a mean (SD) follow-up of 31.3 (20.9) months met the inclusion criteria. The mean (SD) age of study participants was 38.4 (13.1) years, and men accounted for 74%. The number of eyes that underwent AULT, ALLT, cAULT, and cALLT were 505, 742, 771, and 184, respectively. Improvement of the ocular surface was achieved in 74.5% of all eyes, 85.7% of eyes after AULT (95% CI, 79.5%-90.3%), 84.7% after cAULT (95% CI, 77.2%-90.0%), 57.8% after ALLT (95% CI, 49.0%-66.1%), and 63.2% after cALLT (95% CI, 49.3%-75.2%). Autologous limbal transplantation resulted in a greater VA improvement rate (76%) than did the other 3 procedures (cAULT: 56.4%; ALLT: 52.3%; cALLT: 43.3%; all P < .001). The most common adverse events in all recipient eyes were recurrent/persistent epithelial erosion (10.5%; 95% CI, 7.2%-23.3%) and elevated intraocular pressure (intraocular pressure, 1.7%; 95% CI, 0.5%-7.8%). Patients who underwent ALLT had the highest rate of recurrent epithelial erosion (27.8%; 95% CI, 17.1%-41.9%) and intraocular pressure elevation (6.3%; 95% CI, 1.8%-19.4%). Conclusions and Relevance: These findings suggest LSCT can improve or stabilize the corneal surface with a low rate of severe ocular complications and that autologous LSCT may have a higher success rate and fewer complications than allogenic LSCT.

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